# NOTE

ON

# SIMPLE MACHINES FOR EXTRACTING PLANTAIN FIBRE.

BY

**R. L. PROUDLOCK,**

CURATOR, GOVERNMENT BOTANIC GARDENS AND PARKS, THE NILGIRIS.

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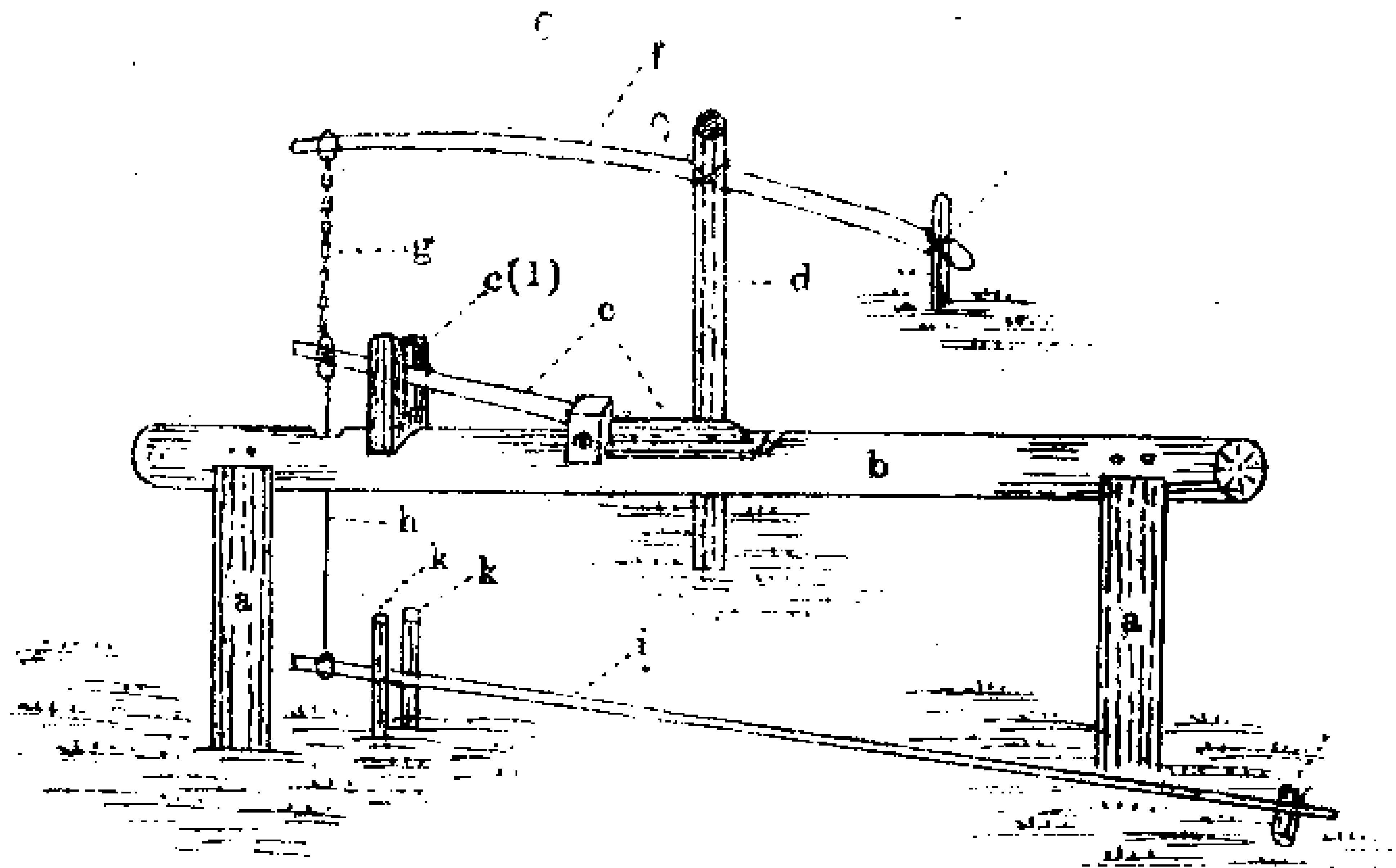
In paragraph 44 of the Annual Administration Report of the Government Botanic Gardens and Parks, the Nilgiris, for the year 1900–1901, I referred to the Manilla Hemp Plantain and to the two patterns of machines that are in general use in the Philippines for cleaning the fibre. I also stated that I had patterns of these two simple machines made from the descriptions given in the "Kew Bulletin," Additional Series II, I—Vegetable Fibres, and in Volume IX, Part I, New Series, 1891, pages 57–62, of the "Journal of the Agri-Horticultural Society of India." And I have especially to acknowledge my indebtedness to Mr. A. Brown's "Sketch of a Knife used by the Natives at Gubat, Philippine Islands, for extracting the Fibre from *Musa textilis*" on page 62 of the journal referred to. It will be observed that the essential principles in Mr. Brown's sketch and in my sketch of machine No. 1 are the same, although it will be observed that the fittings are slightly different in my sketch.

2. Patterns of machines No. 1 and No. 2 were exhibited and worked at the Flower Show of the Nilgiri Agri-Horticultural Society held at Ootacamund on the 1st June 1901—*vide* the account in the *Madras Mail* of June 3rd, 1901. Consequent on public attention having thus again been temporarily directed to plantain fibre and its possibilities, I have received letters from different parts of India, as well as from Ceylon and Burma, inquiring for plans of the machines and directions for working them.

3. With a view, therefore, to rendering available to the public in a concise form such information on the subject as was asked for, I considered it desirable to have diagrams of these two primitive fibre-extractors made; to write the following few necessary accompanying notes to explain their construction and the method of working them; and to make a few general remarks on the subject.

4. For those who wish for very full information about "Manilla Hemp" and other plantain fibres, Volume V, pages 296–307 of the "Dictionary of Economic Products of India" may be advantageously consulted.

5. The following is a sketch of No. 1 fibre-extractor which I consider to be a better type than No. 2 :—



No. 1—Sketch of a simple machine which is used at Gubat, Philippine islands, for extracting plantain fibre.

6. *Explanation of Sketch of No. 1 Plantain fibre-cleaner*—

*a—a*. Two posts fixed in the ground to support the horizontal beam *b*. The beam is fastened securely to the posts by eight stout nails.

*b*. Round wooden beam, 8½ feet in length by 6 inches in diameter, fixed horizontally on supports *a—a*, with its upper surface at a height of about 2 feet 7 inches from the ground.

*c*. Iron knife, about 9 lb. in weight and 3½ feet in length, with a blunt edge, fixed on an axle to the beam *b*. The blade of the knife should close firmly, and very evenly, on to an iron sole-plate, 15 inches in length by 2 inches in width, and half an inch in thickness, which is secured to the beam *b* by screws.

*c (1)*. Wooden block fixed in the beam *b* with a deep groove cut in it to accommodate the handle of the knife *c* for the purpose of keeping it steady. The groove allows the handle to be moved up and down freely, but prevents it from being moved to an undesirable extent laterally.

*d*. Post fixed in the ground at right angles to the beam *b* at a distance of 6 feet from the latter. The post should stand about 4½ feet above the ground level for the purpose of supporting the pole *f*.

*e*. Post driven into the ground firmly at a distance of about 6 feet from *d*, and standing about a foot and-a-half above the ground, for the purpose of tying the base of the pole *f* to.

*f*. Bamboo or other strong supple pole, about 14 feet in length, tied to the two posts *d* and *e* so as to act as a strong spring to which the handle of the knife *c* is connected by a chain.

*g*. Chain, connecting *f* with *c*, which can be lengthened or shortened as is found necessary in order to obtain the desired pressure of the blade of the knife on the fibre. 1 foot 7 inches to 1 foot 10 inches will be found a useful working range of length of the chain or distance between the end of the bamboo *f* and the end of the knife *c*.

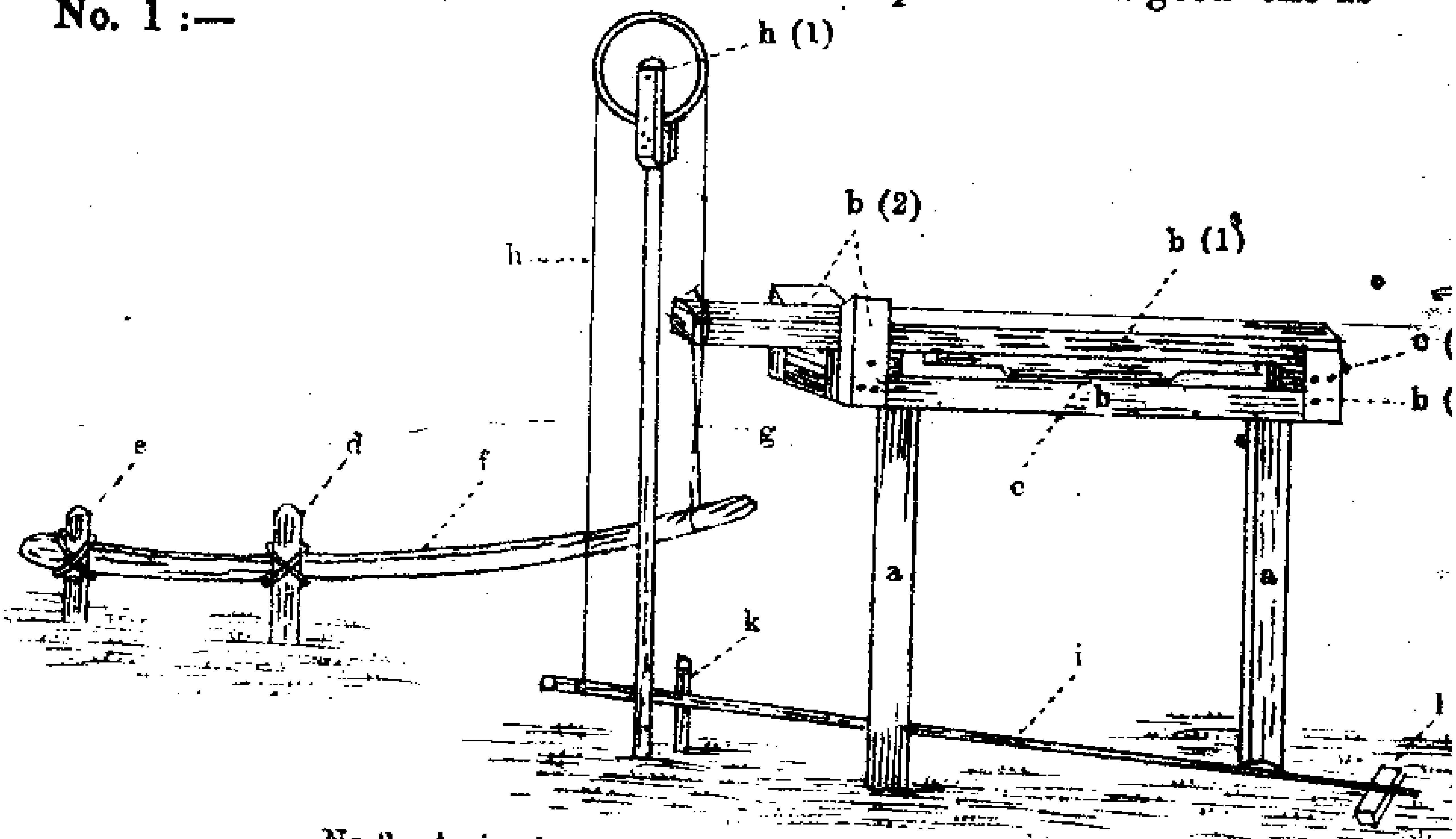
*h.* Piece of cord fixed to the end of the knife *c*, then passing through a hole made in the longitudinal centre of the beam *b* and tied to the end of a long straight stick or bamboo *i*.

*i.* Bamboo or stick, about 7½ feet in length, which is supported by the cord *h* at one end, and by a brick, stone or piece of wood *l* at the other, so as to serve the purpose of a pedal. When the foot is placed on the stick with a little pressure, the handle of the knife *c* is depressed and the blade is thereby opened for the reception of a strip of plantain which it is intended to clean.

*k, k.* Two small stakes driven into the ground and standing about 15 inches in height to serve as guides for keeping the pedal *i* steady.

*l.* Brick, stone or piece of wood to support the end of the pedal *i* about 3 inches above the ground.

7. The following is a sketch of No. 2 plantain fibre-cleaner. I do not, however, consider this machine to be quite such a good one as No. 1 :—



No. 2—A simple machine for extracting plantain fibre.

8. *Explanation of Sketch of No. 2 Plantain fibre-cleaner*—

*a—a.* Two posts, each about 5 inches in diameter, fixed firmly in the ground, with their centres about 2 feet 1 inch apart to support the frame work *b* and *b (1)*.

*b.* Lower wooden bar, 3′ 1½″ × 3¼″ × [illegible] fixed on to the posts *a—a* by four strong nails.

*b (1).* Upper wooden bar, 3′ 8″ × 3¼″ × 2″, hinged to *b* at *c (1)*, and secured from being moved laterally by wooden guides *b (2)*.

*c.* Knife made of [illegible] × ¼″ iron, with a sloping edge, which rests on a sole-plate made of 1½″ × ¼″ iron. The total length of the knife is two feet, and the length of the central blade is 1 foot. The knife is secured by four screws to the under side of the upper wooden bar *b (1)*. The iron sole-plate, which is secured to the lower wooden bar *b* by two screws, should be fixed at a height of about 2 feet 11 inches from the ground level.

*c* (*1*). Strong hinges to connect one end of the upper wooden bar *b* (*1*) with the lower wooden bar *b*.

*d*. Stake driven firmly into, and standing 16 or 17 inches above, the ground to secure the spring *f* to. The stake is fixed at right angles to the wooden bars *b* and *b* (*1*) at a distance of about 5½ feet away.

*e*. Stake driven into, and standing 12 or 13 inches above, the ground, about 3½ feet behind *d*, to secure the spring *f* to.

*f*. Bamboo or other strong supple pole about 10 or 11 feet in length, tied to the two posts *d* and *e* so as to act as a strong spring to which the free end of the beam *b* (*1*) carrying the knife is connected by a cord or chain *g*.

*g*. Cord or chain to connect the free end of the wooden knife bar *b* (*1*) with the spring *f*.

*h*. Cord working over a pulley *h* (*1*) to connect the end of the pedal *i* with the free end of the wooden bar *b* (*1*) for the purpose of opening the knife when desired.

*h* (*1*). Wooden wheel fixed on the end of a pole standing about 6½ or 7 feet above the ground for the purpose of supporting the cord *h* and of admitting of its free and easy working.

*i*. Bamboo or other stick about 5½ feet in length to serve the purpose of a pedal.

*k*. Small stake driven into the ground to serve as a guide to keep the pedal steady. The base of the post supporting the wheel *h* (*1*) serves as the other guide.

*l*. Piece of wood, brick or stone to rest the end of the pedal *i* on.

9. Having got the machine or machines fitted up, the next thing to do is to see that the knife-blade fits very evenly and correctly on the flat, iron, sole-plate. On no account must the edge of the blade be too sharp, otherwise the fibre will be cut or broken. Having got the knife of the requisite bluntness the next thing to be considered is the pressure exercised by the spring *f*. A little experience will enable the operator to adjust the pressure to the exact degree that is required to get the best results out of the machine. If the pressure is too great the fibre will be unduly strained and broken more or less. If, on the other hand, the pressure is insufficient, an unnecessary number of strokes have to be given to get the fibre clean. It is therefore a most important matter to adjust correctly the pressure of the knife-blade. For this purpose, a chain *g* is better suited than a cord to connect the knife handle *c* and the spring *f*, as the individual links furnish an easy means of graduating the shortening or lengthening of the chain, so that almost any degree of pressure that may be desired can be readily obtained.

10. The plantain stems should be cut into 3½ feet lengths: each length should be opened up into its component parts; and the component parts should be split into strips 1½ inches in width. The strips are now ready for being cleaned; and it is advisable that they should be cleaned the same day as the stems are cut down.

11. It will be found that the inner, white and tender, strips are very much easier to clean than the outer green-coloured strips. The inner strips yield a fine soft, yet strong, fibre; while the green-coloured strips yield a rather coarse fibre. It is, therefore, advisable to reject the

two or three outermost component parts (leaf stalks) of the plantain stem, as they are, as a rule, difficult to clean.

12. The operator should now take a strip in his hands, and place his foot on the pedal *l* to open the knife. Then place the strip, innerside uppermost, on the iron sole-plate under the open knife, keeping hold of about six or seven inches of the end of the strip, and then allow the knife-blade to close carefully on the strip by taking the foot off the pedal. Now, with both hands the operator should draw the strip, with a good steady pull, through between the blade of the knife and the iron sole-plate. The strip should be passed under the knife two or three times, innerside uppermost, and then a few times, outerside uppermost; and, if the pressure on the knife has been correctly adjusted, the strip should be cleaned in about half-a-dozen, or fewer strokes. Having cleaned one end of the strip, which will now appear as clean fibre, the other end which was held in the hand should be cleaned. Place it under the knife, innerside uppermost, leaving about half an-inch to be cleaned by the second and subsequent strokes, and draw it through quickly. After three or four strokes the fibre will appear quite clean. Now hold the piece of fibre in the centre and give it three or four sharp shakes; then hang it up on a string or bamboo, fixed horizontally at a height of, say, 5¾ feet from the ground, conveniently close to the machine to dry. If the day be fine and bright the fibre will dry in a few minutes; but it should be allowed to hang for several hours to dry it thoroughly. As soon as it is dry it can be made into cords or ropes or stored away for future use.

13. It must not be expected that an ordinary cooly can become really expert at the work of cleaning plantain fibre with one of these primitive machines without a considerable amount of practice. With a view, therefore, to getting a man to become thoroughly expert at the work he should be kept steadily at it day after day for a month or more on daily wages. As soon as the employer is satisfied that his man can turn out what he considers to be a satisfactory quantity of fibre per day, he might suggest contract work to his man at so much per pound of fibre. The employer can easily calculate and settle for himself what rate he can afford to offer to his cooly or coolies for the fibre after ascertaining its current market value.

14. Planters, zemindars and especially the ryots and villagers who have plantains growing on their estates and in their gardens might, with the aid of these primitive machines, very easily and without much expense obtain all the fibre necessary to make cords and ropes for their own requirements. Should either or both of these patterns of primitive machines ever be adopted by the ryots and villagers, it is probable that considerable improvements will be effected in them in course of time by engineers or by others of an inventive turn of mind.

15. The fibre can also be extracted by scraping the plantain strips with a bamboo scraper on a hard smooth board 5′ × 6″ × 2″, precisely in the same way as agave fibre is cleaned by the villagers in the Coimbatore district.

16. There can be no question as to the vast quantities of plantain stems that are available in this country; and it would be a good thing if even a tithe of the enormous quantity of fibre which could be obtained from them could be turned to account. If the professional fibre-cleaners

could be induced to take to extracting the common plantain fibre, an industry in it would gradually become established; but it is not likely to be taken up unless the practical utility of it is clearly demonstrated to them. It is, therefore, evident that, if ever the industry is to gain a permanent footing, one of the best means to be employed would be to visit the professional fibre-cleaners in their villages and give practical demonstrations to them by trained men in extracting plantain fibre by means of these simple machines. The different jails, near to which plantains happen to be largely grown, would also afford excellent opportunities for circulating widely a practical knowledge of the extraction of the fibre if short-term prisoners, belonging to the agricultural classes, were compelled to acquire proficiency in the work.

17. Of course the fibre obtained from the common plantain is not so strong as that which is obtained from *Musa textilis*, the "Manilla hemp" of commerce, and it will not therefore fetch anything like the price of the latter. It can therefore never compete favourably with "Manilla hemp" in the European markets. But, once the natives of India take to extracting and utilizing the fibre of the common plantain, it is almost a foregone conclusion that an industry in the much more valuable fibre of *Musa textilis* would follow in course of time.

18. In conclusion, the industry in extracting fibre for cordage from plantain stems after they have each borne their bunch of fruit is more certain to be of local interest and benefit to the Indian cultivators than it is ever likely to attain any importance as an article of export.

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OOTACAMUND,
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